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A125/A026

Pneumatic Motor With Air Lubricated Bearings

testing the operation of air lubricated bearings and examining bearing materials and their friction. There are 5 figures and 3 photographs.

SUBMITTED: October 20, 1959

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R/008/60/000/002/003/007
D246/D303

AUTHORS: Tipei, N., and Constantinescu, V.N.

TITLE: Generalization of the Reynolds equation in the study of lubrification under turbulent conditions

PERIODICAL: Studii și cercetări de mecanică aplicată, no. 2, 1960, 359-363

TEXT: The authors deduce in the present article the pressure equation in the case of lubrification under turbulent conditions. Considering an orthogonal system of $Ox_1x_2x_3$ axes in such a way that Ox_1, x_3 may expand over a solid surface (1), and that Ox_2 is the normal to it, the equations of the turbulent motion of a fluid can be deduced between one solid surface (1) and another solid surface (2) located at a very small distance h, and variable with the point against the first surface. With $\bar{p}$, $\bar{v}_i$ - pressure and veloci-

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ty according to the Ox_i medium axis, V_{1i}, V_{2i} ($i = 1, 2, 3$) - components of the absolute velocities of surfaces (1) and (2), μ - dynamic viscosity, and v_{im} - expression

$$v_{im} = \frac{1}{h}\int_0^h \bar{v}_i \, dx_2 \qquad (1)$$

V.N. Constantinescu (Ref. 1: Studiul lubrificației bidimensionale în regim turbulent (Studies on Bidimensional Lubrification under Turbulent Conditions) Studii și cercetări de mecanică aplicată, IX, 1, 139-162, 1958) established the component of the pressure gradient on Ox_1:

$$\frac{\partial \bar{p}}{\partial x_1} = -\left[12 + 0.16\left(\frac{\sigma^{*2}}{0.16}\mathrm{Re}\right)^{0.725}\right]\frac{\mu}{h^2}\left(v_{1m} - \frac{V_{11} + V_{21}}{2}\right). \qquad (2)$$

In this relation $\pm\, \sigma^* = \left(\frac{dl^*}{dx_2}\right)_{\substack{x_2 = 0 \\ x_2 = h}}$, ($l^*$ = mixture length), and

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$\mathcal{R}e$ (the Reynolds number) $= \frac{\rho Vh}{\mu}$; $(V = V_{11} + V_{21})$. Selecting axis Ox_1 so that it is included in the plane of the relative motion and the normal Ox_2 is on surface (1) $V_{13} + V_{23} = 0$, and

$$\frac{\partial p}{\partial x_3} = \pm (12 + 0.103 \mathcal{R}e^{0.745}) \frac{\mu}{h^2 V^{0.089} \mathcal{R}e^{0.18}} / v_{3m} /^{1+0.089 \mathcal{R}e^{0.18}} . \quad (3)$$

Since ρ can be considered invariable on a normal surface, the authors establish the following expression:

$$\int_0^h \frac{\partial}{\partial x_i} (\rho \bar{v}_i)\, dx_2 = \frac{\partial}{\partial x_i} \int_0^h (\rho \bar{v}_i)\, dx_2 - \rho V_{2i} \frac{\partial h}{\partial x_i} = \frac{\partial}{\partial x_i} (\rho h\, v_{im}) - \rho V_{2i} \frac{\partial h}{\partial x_i}. \quad (4) \qquad (4)$$

Integrating the continuity equation between 0 and h, they obtain

$$-\int_0^h \left(\frac{\partial (\rho \bar{v}_1)}{\partial x_1} + \frac{\partial (\rho \bar{v}_3)}{\partial x_3} \right) dx_2 = \rho (V_{22} - V_{12}) + h \frac{\partial \rho}{\partial t}, \quad (5) \qquad (5)$$

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or considering (1) and (4)

$$-\frac{\partial}{\partial x_1}(\rho h v_{1m}) - \frac{\partial}{\partial x_3}(\rho h v_{3m}) = \rho(V_{22} - V_{12}) + h\frac{\partial \rho}{\partial t} - \rho\left(V_{21}\frac{\partial h}{\partial x_1} + V_{23}\frac{\partial h}{\partial x_3}\right). \qquad (6)$$

Introducing then the values of the medium velocities given by formulae (2) and (3), the pressure equation under turbulent conditions is obtained:

$$\frac{\partial}{\partial x_1}\left(\frac{h^3\rho}{\mu k_1}\frac{\partial p}{\partial x_1}\right) \pm \frac{\partial}{\partial x_3}\left[\left(\frac{h^2 V^{n_3-1}}{\mu k_3}\left|\frac{\partial p}{\partial x_3}\right|\right)^{\frac{1}{n_3}}\rho h\right] = \rho(V_{22} - V_{12}) + \frac{1}{2}\frac{\partial}{\partial x_1}[\rho h(V_{11} + V_{21})] - \rho\left(V_{21}\frac{\partial h}{\partial x_1} + V_{23}\frac{\partial h}{\partial x_3}\right) + h\frac{\partial \rho}{\partial t}, \qquad (7)$$

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$$k_1 = 12 + 0{,}14\left(\frac{\sigma^{*2}}{0{,}16}\mathcal{R}_e\right)^{0.725}, \quad k_3 = 12 + 0{,}103\left(\frac{\sigma^{*2}}{0{,}16}\mathcal{R}_e\right)^{0.745},$$
$$n_3 = 1 + 0{,}080\left(\frac{\sigma^{*2}}{0{,}16}\mathcal{R}_e\right)^{0.18}. \quad (7) \qquad (7)$$

In this equation + is taken for $\frac{\partial p}{\partial x_3} > 0$ and vice versa. The second member of the preceding relation is identical with the one which appears in the pressure equation for laminar lubricating conditions. Since it is fairly difficult to apply Eq. (7), a linear connection between $\frac{\partial p}{\partial x_3}$ and v_{3m} may be admitted in fields having not too great a pressure ($p < 50$ kg/cm^2):

$$\frac{\partial p}{\partial x_3} = -\left[12 + 0{,}0897\left(\frac{\sigma^{*2}}{0{,}16}\mathcal{R}_e\right)^{0.65}\right]\frac{\mu}{h^2}v_{3m}. \quad (8) \qquad (8)$$

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On the basis of this relation, the authors establish from (6):

$$\left.\begin{aligned} &\frac{\partial}{\partial x_1}\left(\frac{h^3\rho}{\mu k_1}\frac{\partial p}{\partial x_1}\right)+\frac{\partial}{\partial x_3}\left(\frac{h^3\rho}{\mu k_3}\frac{\partial p}{\partial x_3}\right)=\rho(V_{22}-V_{12})+\\ &+\frac{1}{2}\frac{\partial}{\partial x_1}[(\rho h(V_{11}+V_{21})]-\rho\left(V_{21}\frac{\partial h}{\partial x_1}+V_{23}\frac{\partial h}{\partial x_3}\right)+h\frac{\partial\rho}{\partial t},\\ &k_3=12+0{,}0897\left(\frac{\sigma^{*2}}{0{,}16}\,\Re_*\right)^{0{,}65}. \end{aligned}\right\}\ (9) \qquad (9)$$

This formula is much similar to the pressure equation in laminar conditions than (7). Its application field determined by the maximums and minimums of the pressures is smaller; it can be used, however, for all variations of p. The authors then consider ρ = constant, i.e. a lubrication with liquids. Considering a variation law of the viscosity, as shown by N. Tipei (Ref. 2: Hidro-aerodinamica lubricației (Hydro-Aerodynamics of Lubrification), Ed.

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Generalization of the Reynolds ...

Acad. R.P.R., 1957), having the shape

$$\mu = \mu_1 \left(\frac{h}{h_1}\right)^q \quad (10)$$

in which h_1 is the maximum thickness of the fluid film, the Reynolds number becomes constant for the whole lubrifying layer if $q = 1$.

$$\left.\begin{aligned} \mathcal{R}_e &= \frac{\rho V h}{\mu} = \frac{\rho V h^{1-q} h_1^q}{\mu_1}, \\ \mathcal{R}_{e_{q=1}} &= \frac{\rho V h_1}{\mu_1} = \text{const.}, \end{aligned}\right\} \quad (11) \qquad (11)$$

and thus k_1 and k_3 do not vary with the point. Using the variable changes as shown by V.N. Constantinescu (Ref. 4: Consideraţii asupra lubrificaţiei tridimensionale în regim turbulent (Considerations on Tridimensional lubrification under Turbulent Conditions)

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Studii şi cercetări de mecanică aplicată, X, 4, 1959)

$$\tilde{x}_3 = \sqrt{\frac{k_3}{k_1}}\, x_3, \qquad \tilde{V}_{ij} = \frac{k_1}{12} V_{ij}, \qquad (12)$$

the authors determine from (9), if V_{ij} does not depend on x_3:

$$\frac{\partial}{\partial x_1}\left(\frac{h^2 h_1}{12\,\mu_1}\frac{\partial p}{\partial x_1}\right) + \frac{\partial}{\partial \tilde{x}_3}\left(\frac{h^2 h_1}{12\,\mu_1}\frac{\partial p}{\partial \tilde{x}_3}\right) = \tilde{V}_{22} - \tilde{V}_{12} + \frac{h}{2}\frac{\partial}{\partial x_1}(\tilde{V}_{11} + \tilde{V}_{21}) + \frac{1}{2}(\tilde{V}_{11} - \tilde{V}_{21})\frac{dh}{dx_1}, \qquad (13)$$

i.e. the lubrication equation in laminar conditions, but in ratio with the variables x_1 and x_3 and for velocities $\tilde{V}_{ij}$. Everything proceeds as if elongation would suffer a modification $\tilde{\lambda} = \sqrt{\frac{k_3}{k_1}}\,\lambda$, and velocities are amplified by $\frac{k_1}{12} > 1$. Using these

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observations, all results of the laminar state may also be used for turbulent lubrification (Ref. 2: Op.cit.). For $q \neq 1$, Eqs. (7) and (9) are difficult to solve, even where the density does not vary. Generally it may occur that in certain states of motion, sections exist in which $\mathcal{R}e > \mathcal{R}e_c$ and in other sections $\mathcal{R}e < \mathcal{R}e_c$. In the case of a plane motion, however, if the flow no longer depends on x_3 and designating h_0 the thickness at the point where the pressure has maximum value by applying the continuity law, there results:

$$\rho h v_{1m} = \frac{1}{2} \rho_0 h_0 V \tag{14}$$

and subsequently the effective Reynolds number

$$\mathcal{R}e_e = \frac{\rho v_{1m} h}{\mu} = \frac{\rho_0 h_0 V}{2\mu} \tag{15}$$

For a constant viscosity, $\mathcal{R}e_e$ = const. This shows that the motion becomes turbulent in the whole fluid layer if $2\mathcal{R}e_e \geqslant \mathcal{R}e_c$, as

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Generalization of the Reynolds ...

shown by V.N. Constantinescu (Ref. 3: Consideraţii asupra lubrificaţiei cu gaze în regim turbulent (Considerations on Gas Lubrication in Turbulent Conditions) Studii şi cercetări de mecanică aplicată, IX, 2, 369-376, 1958). There are 4 Soviet-bloc references. /Abstractor's note: This is essentially a complete translation/.

SUBMITTED: February 10, 1960

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CONSTANTINESCU, V. N.

PHASE I BOOK EXPLOITATION SOV/5055

Vsesoyuznaya konferentsiya po treniyu i iznosu v mashinakh. 3d, 1958.

Gidrodinamicheskaya teoriya smazki. Opory skol'zheniya. Smazka i smazochnyye materialy (Hydrodynamic Theory of Lubrication. Slip Bearings. Lubrication and Lubricant Materials) Moscow, Izd-vo AN SSSR, 422 p. Errata slip inserted. 3,800 copies printed. (Series: Its: Trudy, v. 3)

Sponsoring Agency: Akademiya nauk SSSR. Institut mashinovedeniya. Resp. Eds. for the Section "Hydrodynamic Theory of Lubrication and Slip Bearings": Ye. M. Gut'yar, Professor, Doctor of Technical Sciences, and A. K. D'yachkov, Professor, Doctor of Technical Sciences; Resp. Ed. for the Section, "Lubrication and Lubricant Materials": G. V. Vinogradov, Professor, Doctor of Chemical Sciences; Ed. of Publishing House: M. Ya. Klebanov; Tech. Ed.: O. M. Gus'kova.

PURPOSE: This collection of articles is intended for practicing engineers and research scientists.

COVERAGE: The collection, published by the Institut mashinovedeniya AN SSSR (Institute of Science of Machines, Academy of Sciences USSR) contains papers presented at the III Vsesoyuznaya konferentsiya po treniyu i iznosu v mashinakh (Third All-Union Conference on Friction and Wear in Machines) which was held April 9-15, 1958. Problems discussed were in

Hydrodynamic Theory (Cont.) SOV/5055

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A125/A126

26.2182

AUTHOR: V.N. Constantinescu

TITLE: On the dynamic behaviour of air-lubricated bearings

PERIODICAL: Studii şi Cercetări de Mecanică Aplicată, no. 4, 1960, 893 - 907

TEXT: The author examines the dynamic behaviour of air-lubricated bearings submitted to variable forces and speeds and he studies the causes of vibrations. If the operation of the bearing is non-permanent, there exists a motion of the shaft in relation to the bearing which has an influence on the pressure distribution. In addition the bearing is generally not perfectly rigid and its fastening to the motor is to a certain degree elastic. Under these conditions the pressures will produce a displacement of the bearing. By knowing the external forces, the operation of air-lubricated bearings under non-permanent conditions can thus be determined, making it possible to design the bearings in such a way that the minimum thickness of the lubricating layer would not fall below the critical limit. The faultless operation of air lubricated bearings also requires a study of the fact, whether or not the motion in the lubricating layer generates non-damped or slightly damped vibrations. This study has been generally accom-

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plished for plane motions in (Ref. 1: V. N. Constantinescu, Asupra stabilităţii mişcării lagărelor circulare lubrificate cu gaze. Studii şi cercetări de mecanică aplicată, X, 1, 117 - 140, 1959) on the basis of the method of small disturbances used by N. Tipei (Ref. 2: Hidroaerodinamica lubrificaţiei. Ed. Acad. R. P. R. Bucureşti, 1957). The mathematical considerations of stable or non-stable motion and of loads have been verified by experiments conducted with a pneumatically driven motor, provided with air lubricated bearings, which are described by V. N. Constantinescu and Gh. Marin (Ref. 8: Motor pneumatic cu lagăre cu aer. Studii şi cercetări de mecanică aplicată, XI, 1, 1960). No vibrations could be established up to 15,000 rpm. Above this speed, a vibration of a frequency close to the half value of the rotor speed has appeared. The second harmonics have also appeared in case of vertical operation. Occasionally, a low-frequency vibration (40 cps) has appeared additionally. This frequency was influenced by the masses in contact and was possibly produced by a nonstable operation of the axial bearings. Similar vibrations have been obtained by L. Licht, D. D. Fuller, and B. Sternlicht (Ref. 9: Self Excited vibration of an Air Lubricated. Thrust Bearing ASLE Paper, 57, L. C. 12). The motion is generally unstable and the initially non-damped vibrations will be maintained at a low amplitude. An increase of the tolerance has

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an unfavourable influence on the stability. Vibrations with a frequency close to half of the revolution rate have also been detected by G. F. Boeker and B. Sternlicht (Ref. 10: Investigation of Translatory Fluid Whirl in Vertical Machines, Transactions of the ASME, 78, 1, 13 - 19, 1956). A revolution rate close to twice the value of the critical revolution of the respective rotor will be dangerous because of continuous disturbances produced by the bearing vibrations, which then would have a frequency equal to the critical frequency of the rotor. There are 3 figures and 10 references: 6 Soviet-bloc and 4 non-Soviet-bloc. The four references to the English language publications read as follows: W. A. Gross, Film Lubrification, part I, I B M Scientific Publication, 1957; H. Poritsky, Contribution to the theory of oil Whip. Transactions of the ASME, 75, 6, 1953; L. Licht. D. D. Fuller, B. Sternlicht, Self Excited vibration of an Air Lubricated. Thrust Bearing. ASLE Paper, 57, L. C. 12; G. F. Booker, B. Sternlicht, Investigation of Translatory Fluid Whirl in Vertical Machines, Transactions of the ASME, 78, 1, 13 - 19, 1956.

SUBMITTED: March 12, 1960

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22243
R/008/60/000/005/001/014
A231/A126

16.7600 also 1583

AUTHORS: Tipei, N., and Constantinescu, V. N.

TITLE: The influence of the variation law of the mixture length on the turbulent motion in the lubricating layer

PERIODICAL: Studii şi Cercetări de Mecanică Aplicată, no. 5, 1960, 1091-1101

TEXT: The authors examine the influence of the variation law of the mixture length on the distribution speeds in a lubricating layer. The motion is considered along an axis between two neighbouring walls of an arbitrary shape. In case the flow within the lubricating layer is turbulent, the motion equation can be expressed by the equation system

$$\frac{\partial \bar{p}}{\partial x_1} = \mu \frac{\partial^2 \bar{v}_1}{\partial x_2^2} + \frac{\partial}{\partial x_2} (-\rho \overline{v_1' v_2'}),$$
$$\frac{\partial \bar{p}}{\partial x_2} = \frac{\partial}{\partial x_2} (-\rho \overline{v_2'^2}), \quad (1)$$
$$\frac{\partial \bar{p}}{\partial \bar{x}_3} = \mu \frac{\partial^2 \bar{v}_3}{\partial x_2^2} + \frac{\partial}{x_2} (-\rho \overline{v_2' v_3'}),$$

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where p is the pressure, μ the viscosity, ρ the density of the lubricant, v_1, v_2, v_3 the speed components and x_1, x_2, x_3 the coordinate axes. The second equation of the system (1) gives the pressure distribution according to the normal of the lubricating layer, whereas the first and the third equations control the speed distribution, requiring the knowledge of the turbulent stresses $\overline{v_1' v_2'}$, $\overline{v_2'^2}$, $\overline{v_2' v_3'}$. Due to the low thickness of the lubricating layer, the turbulent stresses can be determined by using the hypothesis of the mixture length of Prandtl. After considering several hypotheses, the authors deduce from the first equation of the system (1) the equation

$$\sigma^{*2} Re \frac{1^{*2}}{\delta^2} \frac{\partial \overline{v}_1}{\partial \overline{x}_2} \left|\frac{\partial \overline{v}_1}{\partial \overline{x}_2}\right| + \frac{\partial \overline{v}_1}{\partial \overline{x}_2} - \frac{\delta^2}{\mu V} \frac{\partial p}{\partial x_1} \overline{x}_2 - C = 0, \qquad (5)$$

which has previously been integrated, considering a linear variation of the mixture length

$$\begin{aligned} \overline{I}^* &= \frac{1^*}{\delta} = \overline{x}_2 \qquad \left(0 < x_2 \leq \frac{\delta}{2}\right), \\ \overline{I}^* &= \frac{1^*}{\delta} = 1 - \overline{x}_2 \quad \left(\frac{\delta}{2} \leq x_2 \leq \delta\right), \end{aligned} \qquad (8)$$

The hypothesis of the linear variation of the mixture length requires a di-

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vision of the thickness of the lubricating layer into two equal portions, in which the length l has different variations, the two straight lines intersecting each other at $x_2 = \frac{\delta}{2}$. This pressure however, is only an approximation. In order to appreciate this error, the authors admit a trigonometric and a parabolic variation law

$$\bar{l}^* = \frac{1}{\pi}\sin\pi\bar{x}_2, \tag{9}$$

or

$$\bar{l}^* = \bar{x}_2(1-\bar{x}_2), \tag{10}$$

selected in such a way that the derivative $\left(\frac{\partial \bar{l}^*}{\partial \bar{x}_2}\right)_{\bar{x}_2=0} = \alpha^*$ should have the same value. Designating with x_2^* in (5) the point in which the speed v_1 presents a maximum or a minimum, the C constant will be equal with

$$C = -\frac{\delta^2}{\mu V}\frac{\partial p}{\partial x_1}\frac{x_2^*}{\delta} = -\frac{\delta^2}{\mu V}\frac{\partial p}{\partial x_1}\bar{x}_2^* \tag{12}$$

and the speed derivative on both sides with

$$\left(\frac{\partial \bar{v}_1}{\partial \bar{x}_2}\right)_{\bar{x}_2=0} = C = -\frac{\delta^2}{\mu V}\frac{\partial p}{\partial x_1}\bar{x}^*; \quad \left(\frac{\partial \bar{v}_1}{\partial \bar{x}_2}\right)_{\bar{x}_2=1} = \frac{\delta^2}{\mu V}\frac{\partial p}{\partial x_1} + C = \frac{\delta^2}{\mu V}\frac{\partial p}{\partial x_1}(1-\bar{x}_2^*). \tag{13}$$

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Substituting x*3 for C, the equation (5) can then be written in the form of

$$\sigma^{*2} \mathcal{R}_* \bar{l}^{*2} \frac{\partial \bar{v}_1}{\partial \bar{x}_2} \left| \frac{\partial \bar{v}_1}{\partial \bar{x}_2} \right| + \frac{\partial \bar{v}_1}{\partial \bar{x}_2} - \frac{\delta^2}{\mu V} \frac{\partial p}{\partial x_1} (\bar{x}_2 - \bar{x}_2^*) = 0, \qquad (15)$$

In general cases, the equations (5) and (15) can be expressed by

$$\frac{\partial \bar{v}_1}{\partial \bar{x}_2} = \mp \frac{1 - \sqrt{1 \pm 4\sigma^{*2} \mathcal{R}_* \bar{l}^{*2} \left(C + \frac{\delta^2}{\mu V} \frac{\partial p}{\partial x_1} \bar{x}_2 \right)}}{2\sigma^{*2} \mathcal{R}_* \bar{l}^{*2}}, \qquad (16)$$

The integral equation of $\overline{v_1}$,

$$\bar{v}_1 = \mp \int \frac{1 - \sqrt{1 \pm 4\sigma^{*2} \mathcal{R}_* \bar{l}^{*2} \left(C + \frac{\delta^2}{\mu V} \frac{\partial p}{\partial x_1} \bar{x}_2 \right)}}{2\sigma^{*2} \mathcal{R}_* \bar{l}^{*2}} d\bar{x}_2 + C_2. \qquad (17)$$

is easily calculated in case of $\frac{p}{x_1} = 0$ (a Couette motion). For a linear variation of l*, the respective expressions have been deduced by V. N. Constantinescu (Ref. ~~1: V. N.~~ Canstantinescu, Influenta turbulentei asupra miscarii in stratul de lubrifiant. Studii si cercetari de mecanica aplicata, IX, 1, 103, 1958). In case of a trigonometrical variation, the final solution of $\overline{v_1}$ is given by

$$\bar{v}_1 = \frac{\pi}{2\nu^{*2}\mathfrak{R}_*}\left\{\frac{1}{\operatorname{tg}\pi\bar{x}_2} - \frac{1}{\sqrt{1-k^2}}\left\{\frac{\sqrt{1-k^2\cos^2\pi\bar{x}_2}}{\operatorname{tg}\pi\bar{x}_2} + F\left[\pi\left(\frac{1}{2}-\bar{x}_2\right), k\right] - F\left(\frac{\pi}{2}, k\right) - E\left[\pi\left(\frac{1}{2}-\bar{x}_2\right), k\right] + E\left(\frac{\pi}{2}, k\right)\right\}\right\}. \qquad (24)$$

In order to establish the influence of the law on the connections between the lubricant discharge and $\frac{\partial p}{\partial x_1}$, the authors study the general case of $\frac{\partial p}{\partial x_1} = 0$. Considering $\chi^2 \mathfrak{R}_c l^2 \frac{\partial v_1}{\partial x_2}\left|\frac{\partial v_1}{\partial x_2}\right|$ negligible for $0 \leqslant \overline{x_2} \leqslant \varepsilon_1$, and $(1-\varepsilon_2) \leqslant \overline{x_2} \leqslant 1$, they deduce the approximation

$$\frac{\partial \bar{v}_1}{\partial \bar{x}_2} = \pm \frac{1}{\delta^*\sqrt{\mathfrak{R}_c}} \frac{\sqrt{\pm\left(C + \frac{\delta^2}{\mu V}\frac{\partial p}{\partial x_1}\bar{x}_2\right)}}{\bar{l}^*} = \pm \frac{1}{\delta^*\sqrt{\mathfrak{R}_c}} \frac{\sqrt{\left|\frac{\delta^2}{\mu V}\frac{\partial p}{\partial x_1}\right|}\sqrt{\bar{x}_2 - \bar{x}_2^*}}{\bar{l}^*}. \qquad (27)$$

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which requires the existence of a laminar boundary layer in the vicinity of

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the walls. The various solutions of the equation (27) are given by:

$$
\left.
\begin{aligned}
&(\bar v_1)_{\varepsilon_1<\bar x_1<\bar x_2^{\cdot}} = \\
&= \frac{1}{\sigma^* \sqrt{\mathfrak{R}_*}} \sqrt{-\frac{\delta^2}{\mu V}\frac{\partial p}{\partial x_1} C_1}\left[I_1 + 2\sqrt{\frac{1}{C_1} - 1}\, I_3\right] + \bar v_2^{\cdot} && \Bigg|\; 0 < C_1 = \bar x_2^{\cdot} < 1, \\
&(\bar v_1)_{\bar x_2^{\cdot}<\bar x_1<1-\varepsilon_1} = \\
&= -\frac{1}{\sigma^* \sqrt{\mathfrak{R}_*}} \sqrt{-\frac{\delta^2}{\mu V}\frac{\partial p}{\partial x_1} C_1}\left[-2I_2 + \sqrt{\frac{1}{C_1} - 1}\, I_4\right] + \bar v_1^{\cdot} && \Bigg|\; \frac{\partial p}{\partial x_1} < 0, \\
&(\bar v_1)_{\varepsilon_1<\bar x_1<\bar x_2^{\cdot}} = \\
&= -\frac{1}{\sigma^* \sqrt{\mathfrak{R}_*}} \sqrt{\frac{\delta^2}{\mu V}\frac{\partial p}{\partial x_1} C_1}\left[-I_1 + 2\sqrt{\frac{1}{C_1} - 1}\, I_3\right] + \bar v_1^{\cdot} && \Bigg|\; 0 < C_1 = \bar x_2^{\cdot} < 1, \\
&(\bar v_1)_{\bar x_2^{\cdot}<\bar x_1<1-\varepsilon_1} = \\
&= \frac{1}{\sigma^* \sqrt{\mathfrak{R}_*}} \sqrt{\frac{\delta^2}{\mu V}\frac{\partial p}{\partial x_1} C_1}\left[-2I_2 + \sqrt{\frac{1}{C_1} - 1}\, I_4\right] + \bar v_1^{\cdot} && \Bigg|\; \frac{\partial p}{\partial x_1} > 0,
\end{aligned}
\right\} \quad (28)
$$

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Equation (28): (continued)

$$\bar{v}_1 = \frac{1}{\sigma^* \sqrt{\mathfrak{R}_*}} \sqrt{-\frac{\delta^2}{\mu V} \frac{\partial p}{\partial x_1} C_1} \left[I_1 + \sqrt{1 - \frac{1}{C_1}} I_4 \right] + \bar{v}_1^\cdot;$$

$$C_1 > 1, \frac{\partial p}{\partial x_1} < 0, \quad C_1 < 0, \frac{\partial p}{\partial x_1} > 0,$$

$$\bar{v}_1 = -\frac{1}{\sigma^* \sqrt{\mathfrak{R}_*}} \sqrt{\frac{\delta^2}{\mu V} \frac{\partial p}{\partial x} C_1} \left[-I_1 + \sqrt{1 - \frac{1}{C_1}} I_4 \right] + \bar{v}_1^\cdot;$$

$$C_1 < 0, \frac{\partial p}{\partial x_1} < 0, \quad C_1 < 1, \frac{\partial p}{\partial x_1} > 0,$$

$$\bar{v}_1 = \pm \frac{1}{\sigma^* \sqrt{\mathfrak{R}_*}} \sqrt{\frac{\delta}{\mu V} C_1^\cdot} \ln \frac{\bar{x}_2}{1 - \bar{x}_2} + \frac{1}{2}; \quad \frac{\partial p}{\partial x_1} = 0, \quad C_1^\cdot = \frac{\partial p}{\partial x_1} \delta C_1,$$

The variation law of the mixture length has little influence on the behaviour of the speed distribution in the lubricating layer. But, it has great influence on the pressure distribution and the values of the friction forces

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on both lubricated surfaces. The linear variation law is more accurate than the parabolic law. There are 4 figures and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: T. Laufer, Some Recent Measurements in a Two-Dimensional Turbulent Chanel, Journal of Aeronautical Sciences, 17, 277, 1950.

SUBMITTED: April 2nd, 1960

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35745
S/124/62/000/003/019/052
D237/D301

11.9800

AUTHOR: Constantinescu, V.N.

TITLE: Asymptotic solutions of the equations of gaseous lubricant

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 3, 1962, 89, abstract 3B556 (Comun. Acad.RPR, 1960, 10, no. 11, 941 - 945)

TEXT: Behavior of the solution of a non-linear equation of the gas-dynamical lubricant constructed for the plane polytropic motion of a compressible gas in the thin lubricating layer when the relative velocity V of the motion of lubricated surfaces, tends to infinity, is investigated. Analysis of the integral equation equivalent to the differential equation of the lubricant shows that when $V \to \infty$, then the pressure remains finite along the whole length of the lubricant layer, while the derivative of the pressure w.r. to coordinate is bounded with the possible exception of the finite number of points. 5 references. [Abstractor's note: Complete translation]. √

Card 1/1

TIPEI, N., conf.; CONSTANTINESCU, V.N.; NICA, Al.

Computing journal bearings. Studii cerc mec apl 11 no.6:1377-1395 '60.

1. Institutul politehnic, Bucuresti. Membru al Comitetului de redactic, "Studii si cercetari de mecanica aplicata" (for Tipei).

PAVELESCU, D.; ILIUC, I.; BARBUL, S.; PROCOPOVICE, E.; NASTASE, M.; CONSTANTINESCU, V.

A method of studying wear of bearings with radioisotopes. Studii cerc mec apl 11 no.6:1397-1410 '60.

23027

10.6200 also 1327, 1121, 1502, 1103

R/008/61/000/001/001/011
D237/D301

AUTHORS: Tipei, N., and Constantinescu, V.N.

TITLE: The phugoid paths of high-speed aircraft

PERIODICAL: Studii şi cercetări de mecanică aplicată, no. 1, 1961, 11 - 26

TEXT: The authors define various phugoid motions in the compressibility range, establishing some very general cases which are possible in the range of sonic speed. The authors admit that thrust is equal to drag and the moments around the aircraft are at all times equal to zero. Under these conditions, the angle of attack of the elevator settings and the fuel admission α vary with the Mach number M and the altitude z. Considering S to be the wing surface, ρ the density, and a the speed of sound at the corresponding altitude, relation

$$\sigma(\alpha, \rho, M) = S\frac{\rho}{2}a^2 M^2 C_z(M) \quad (3)$$

(3)

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may be established, wherefrom α can be obtained. [Abstractor's note: Cx is the drag coefficient]. With V = aM speed of the aircraft, P - the lift and r - the curvature radius of the trajectory, the forces which act in the center of gravity G of the solid are represented in Fig. 1, in which G is the aircraft's weight and the angle of the trajectory with the horizontal line.

Fig. 1.

Legend: 1 - Reference line; 2 - center of curvature; 3 - trajectory; 4 - horizontal.

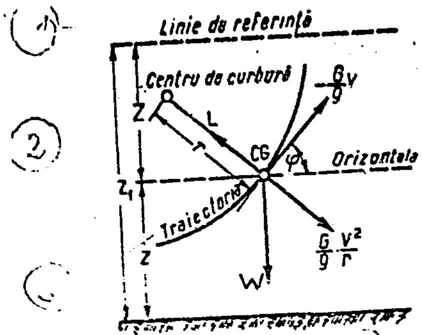

Fig. 1

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If z_1 is the altitude at which V = 0, and where $Z = z_1 - z$, the theory of the phugoid motions immediately supplies

$$a^2 M^2 = 2gZ \qquad (4)$$

Z^*, V^*, ρ^*, a^*, and M^* are the values corresponding to Z, V, ρ, a and M at a horizontal, rectilinear and uniform flight altitude with the same deviation β of the elevator. Since ρ and a depend on z and Z, respectively, the relation of cos φ may be written by:

$$\cos\varphi = \frac{1}{2\rho^* Z^* C_z^*}\frac{1}{\sqrt{Z}}\int \rho\sqrt{Z}\, C_z\left(\frac{Z}{a^2}\right) dZ + \frac{k}{\sqrt{Z}}. \qquad (7)$$

Admitting for subsonic flight the Prandtl-Glauert law, the lift coefficient will be expressed by

$$C_z = C_z^\circ \frac{\sqrt{1-M^{*2}}}{\sqrt{1-M^2}} = C_z^* \frac{\sqrt{1-\frac{2g}{a^{*2}}Z^*}}{\sqrt{1-\frac{2g}{a^2}Z}}. \qquad (9)$$

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and admitting for supersonic flights the Ackeret formula, the authors obtain

$$C_x = C_x^* \frac{\sqrt{M^{*2} - 1}}{\sqrt{M^2 - 1}} = C_x^* \frac{\sqrt{\frac{2g}{a^{*2}} Z^* - 1}}{\sqrt{\frac{2g}{a^2} Z - 1}}, \qquad (11) \qquad (11)$$

in which a = a* can approximately be taken. In the case of subsonic flights, formula (7) can now be written as

$$\cos \varphi = \frac{\sqrt{1 - \frac{2g}{a^2} Z}}{Z^2 \sqrt{Z}} \int \frac{1}{\ } \sqrt{\frac{Z}{1 - \frac{2g}{a^2} Z}} \, dZ + \frac{k}{\sqrt{Z}} \qquad (12)$$

and if the altitude variations are not too great, so that ρ may be considered constant, as

$$\cos\varphi = -\frac{\sqrt{1-\frac{2g}{a^2}Z^*}}{Z^*\sqrt{Z}}\frac{a^2}{2g}\left(\sqrt{Z\left(1-\frac{2g}{a^2}Z\right)}+\sqrt{\frac{a^2}{2g}}\,\mathrm{arc\,tg}\sqrt{\frac{a^2}{2gZ}-1}\right)+\frac{k}{\sqrt{Z}}. \qquad (13)$$

The radius of the trajectory's curvature is expressed by

$$\frac{1}{r} = \frac{1}{2Z}\left(\frac{\rho Z\, C_z(\frac{Z}{a^2})}{\rho^* Z^* C_z^*} - \cos\varphi\right) = \qquad (16)$$

$$= \frac{1}{2Z}\left\{\frac{1}{\rho Z^* C_z^*}\left[\rho Z\, C_z(\frac{Z}{a^2}) - \frac{1}{2\sqrt{Z}}\int\rho\sqrt{Z}\, C_z(\frac{Z}{a^2})\,dZ\right] - \frac{k}{\sqrt{Z}}\right\},$$

whence the trajectory can be deduced, obtaining

$$\int\frac{p\,dp}{(1+p^2)^{3/2}} = -\frac{1}{\sqrt{1+p^2}} = \int\frac{1}{r}dZ + C_1 = \Phi(Z) + C_1 = \cos\varphi \quad (C_1 = 0), \qquad (17)$$

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$$\frac{dZ}{dx} = \pm\sqrt{\frac{1}{\Phi^2(Z)} - 1}, \qquad (17)$$

$$x = \pm\int_{Z_{0m}}^{Z} \frac{dZ}{\sqrt{\frac{1}{\Phi^2(Z)} - 1}} + C_2 = \pm\,\psi(Z) + x_0 + qX_0 \quad (q = 0, 1, 2, \ldots, n).$$

The authors then consider the phugoids at high velocities, studying first the case of $k > 0$. Eqs. (4), (7), (16), and (17) completely define the elements of the motion. Determining ρ and C_Z, all other data may be obtained by simple graphical integrations, also in the most general cases. The horizontal flight at a Z^* altitude is given by the value of the constant

$$k = \frac{2}{3}\sqrt{Z^*}.$$

The point where $\frac{1}{r} = 0$, cos φ passes through a minimum, while the

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corresponding altitude is given by (16). Since Z, ρ, and C_z are always positive, the integral is also positive; if also $k > 0$, there results $\cos\varphi > 0$, $0 < \varphi < \frac{\pi}{2}$, thus the trajectory has the shape of a twisted curve, while Z varies between various altitudes Z_m, (ρ_m, a_m), given by the solutions of the equation

$$Z_m = \left[\frac{1}{2\rho^* Z^* C_z^*}\left(\int \rho \sqrt{Z}\, C_z\left(\frac{Z}{a^2}\right) dZ\right)_{z=z_m} + k\right]^2 \qquad (19) \qquad (19)$$

Considering that ρ does not vary, the approximative basic motion is known in these conditions, whereas the trajectory is a periodical curve with a sinusoidal aspect. The effects of the secondary order are superimposed onto this trajectory which modify the trajectory' shape. The authors then give the equilibrium equation on the vertical line, the resulting differential equation and its two expressions for subsonic velocities and supersonic velocities respectively. The solution of these equations supplies the

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altitude variations as a function of time. The radius of the curvature in the maximum and minimum altitude A_1, A_2, ... A_n is given by the relation

$$r = \frac{2Z_m}{\dfrac{\rho Z_m C_z\left(\dfrac{Z_m}{a_m^2}\right)}{\rho^* Z^* C_z^*} - 1}. \quad (36) \tag{36}$$

If C_z is constant, all maximums of z are located above the $Z = Z^*$ line, while all minimums below this line. Generally, the value of the denominator varies with the altitude less than Z_m which results in the radius of the curvature having smaller values in front of the maximums than in front of the neighboring minimums. Thus, the trajectory appears more flattened at the minimum points than at the maximum ones. If the function ρC_z is continuous, the altitude $z = z_1$ ($Z = 0$) can be attained for only a constant value of $k = 0$. Around the theoretical speed of sound, C_z presents

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a discontinuity element, similar to the trajectory elements φ, r, etc. The authors then discuss the variation of the density and the lift coefficient. If C_z is constant, the speed is considerably reduced. The integral which interferes in the formulae (7), (17), and (19) can be calculated by admitting an expression for the variation of ρ:

$$\rho = \bar{\rho}\, e^{-Kz} = \bar{\rho}\, e^{-Kz_1} \cdot e^{KZ} = \rho_1 e^{KZ} \qquad (40)$$

(40)

whence the integral

$$I_1 = \int \varphi \sqrt{Z}\, dZ = \rho_1 \int e^{KZ} \sqrt{Z}\, dZ =$$

$$= \frac{\rho_1}{g\sqrt{2g}} \int V^2 e^{\frac{K}{2g}V^2} dV = \frac{\rho_1}{\sqrt{2gK}} \left(V e^{\frac{K}{2g}V^2} - \int e^{\frac{K}{2g}V^2} dV \right). \qquad (41)$$

(41)

is deduced. In the case of altitudes of up to 5,000 m, the relations

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$$\left.\begin{aligned} I_1 = \bar{\rho}C_x^{\bullet}\int\frac{\sqrt{Z}}{1-bZ}dZ = -\frac{2\bar{\rho}C_x^{\bullet}}{b}\left(\sqrt{Z}-\frac{1}{2\sqrt{b}}\ln\frac{1+\sqrt{bZ}}{1-\sqrt{bZ}}\right),\\ \Phi(Z) = \frac{\bar{\rho}}{b\rho^{\bullet}Z^{2}}\left(\frac{1}{Z\sqrt{bZ}}\ln\frac{1+\sqrt{bZ}}{1-\sqrt{bZ}}-1\right)+\frac{k}{\sqrt{Z}},\end{aligned}\right\} \quad (43) \tag{43}$$

are found, by which the motion is completely defined. For k = 0, the phugoid equation is

$$x = \pm\int_{Z_{0m}}^{Z}\frac{\left(\frac{1}{3}A+\frac{1}{5}BZ\right)Z\,dZ}{\sqrt{(\rho^{\bullet}Z^{\bullet}C_x^{\bullet})^2-\left(\frac{1}{3}A+\frac{1}{5}BZ\right)^2Z^2}}+x_0+qX_0. \quad (46) \tag{46}$$

Using the notations $F(k_1, \varphi)$ and $E(k_1, \varphi)$ the authors then deduce the elliptic integrals of the first and second species

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$$\left.\begin{aligned}
x &= \pm\sqrt{\frac{5\rho^* Z^* C_z^*}{2B}}\{F(k_1,\varphi) - F(k_1,\varphi_{0m_1}) - 2\,[E(k_1,\varphi) - \\
&\quad - E(k_1,\varphi_{0m_1})]\} + x_0 + qX_0, \text{ pentru } \frac{5A^2}{36B} < \rho^* Z^* C_z^*, \\
x &= \pm\sqrt{\frac{5}{B}}\left\{\frac{5A^2}{36B\sqrt{\rho^* Z^* C_z^* + \frac{5A^2}{36B}}}[F(k_2,\varphi) - F(k_2,\varphi_{0m_2})] - \right. \\
&\quad \left. - \sqrt{\rho^* Z^* C_z^* + \frac{5A^2}{36B}}\;[E(k_2,\varphi) - E(k_2,\varphi_{0m_2})]\right\} + \\
&\quad + x_0 + qX_0, \text{ pentru } \frac{5A^2}{36B} > \rho^* Z^* C_z^*.
\end{aligned}\right\} \quad (50) \qquad (50)$$

At transonic and supersonic speeds, $B < 0$, while the integral is written under a slightly modified shape:

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$$I_2 = \frac{1}{2\sqrt{-\frac{B}{5}}}\int\frac{\zeta d\zeta}{\sqrt{[\zeta^2-(\rho^* Z^* C_z^*)^2]\left(\zeta+\frac{5A^2}{36B}\right)}}. \quad (51)$$

(51)

Using the substitution

$$\left.\begin{array}{l} \zeta = -\rho^* Z^* C_z^* + \left(\rho^* Z^* C_z^* - \frac{5A^2}{36B}\right)\sin^2\varphi \\ k_1^2 = \frac{\rho^* Z^* C_z^* - \frac{5A^2}{36B}}{2\rho^* Z^* C_z^*}; \\ \varphi_{0m_1} = \arcsin\sqrt{\frac{\rho^* Z^* C_z^* + \zeta_{0m}}{\rho^* Z^* C_z^* - \frac{5A^2}{36B}}} \end{array}\right\} \text{for / pentru } -\frac{5A^2}{36B} < \rho^* Z^* C_z^*, \quad (52)$$

)

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$$\left.\begin{aligned} \zeta &= -\rho^* Z^* C_z^* \cos^2 \varphi \\ k_2^2 &= \frac{2\rho^* Z^* C_z^*}{\rho^* Z^* C_z^* - \dfrac{5A^2}{36B}}; \\ \varphi_{0m_2} &= \frac{1}{\Omega} \operatorname{arc\,cos} \frac{-\zeta_{0m}}{\rho^* Z^* C_z^*} \end{aligned}\right\} \text{for pentru } -\frac{5A^2}{36B} > \rho^* Z^* C_z^*. \quad (52)$$

the authors find the equation of the trajectory for k = 0. This equation is identical with (50), if B is everywhere replaced by -B. In the case of $k < 0$, the integral I_1 from the expression $\cos\varphi$ (7) is always positive, since $Z > 0$. In these conditions, where $k < 0$, $\cos\varphi$ obtains always negative values included between - 1 and + 1. Thus, the trajectory will have on the ascending or descending branch an even number of inflection points, opposed to the cases of $k > 0$, when the number of these points is odd. Where the values

$z_m \geqslant z_1$ result from Eq. (19), the trajectories no longer have the the characteristic of periodicity, but in the boundary case $z_m = z_1$ $(\cos \varphi)_{z=z_1} = 1$ as shown in Fig. 4.

Fig. 4.

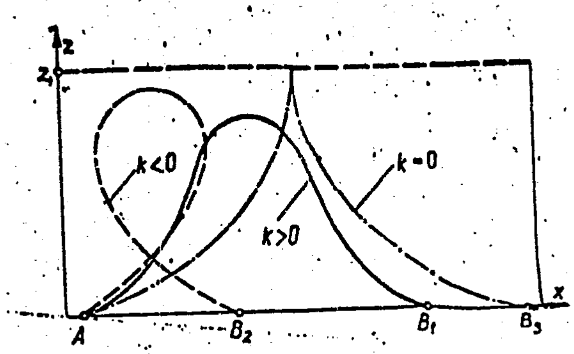

Fig. 4

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The value of the k constant for this boundary case is given by

$$k_1 = \sqrt{z_1} - \frac{1}{2\varrho^* z^* C_z^*}\left(\int \varrho \sqrt{z}\, C_z\left(\frac{z}{a^2}\right) dz\right)_{z=z_1} \qquad (53)$$

which may be positive, negative or zero, as a function of $\varphi^*(z^*)$, C_z and z_1. In all cases if $/k/ > /k_1/$ the motion is aperiodic and limited in horizontal direction by the maximum interval AB_1, AB_2 or AB_3. There are 4 figures and 3 references: 1 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: F.W. Lanchester, Aerodonetics, London, 1906; and W.F. Durand, Aerodynamic Theory, V, J. Springer, 1935.

SUBMITTED: September 12, 1960

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21266
R/008/61/000/002/004/008
D235/D304

26.2123

AUTHOR: Constantinescu, V.N.

TITLE: Similarity criteria in the operation of liquid and gas lubricated bearings

PERIODICAL: Studii şi cercetări de mecanică aplicată, no. 2, 1961, 343 - 361

TEXT: On the basis of the general equations of the lubrification established in a dimensionless shape, the author deduces the similarity criteria, existing in the operation of bearings. These similarity criteria are necessary due to the fact that it is not always possible to check the operation of a bearing. Denoting with u, v, and w the components of the fluid's velocity in the lubricating layer, and with p, ρ, μ, $\varkappa$, and T the pressure, density, viscosity, conductibility coefficient and the absolute temperature, the author first establishes the dimensionless values for these parameters:

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$$\bar{u}=\frac{u}{V};\bar{v}=\frac{v}{V};\bar{w}=\frac{w}{V};\bar{p}=\frac{p}{p_0};\bar{\rho}=\frac{\rho}{\rho_0};\bar{\mu}=\frac{\mu}{\mu_0};\bar{x}=\frac{x}{x_0};\bar{T}=\frac{T}{T_0}, \quad (1) \qquad (1)$$

and after a series of equations, lubricant's rate of flow is finally given by the relation:

$$\frac{Q_1}{Vcb}=C_{q_1}(\epsilon,\lambda,q). \quad (32) \qquad (32)$$

Thus, all elements which characterize the operation of a bearing depend upon the relative dimensions of the bearing, λ, on the variation of the lubrifying layer's thickness, ϵ, and on the thermal condition, q. These elements should be the same, in order to obtain a similar operation of both bearings. Taking also into consideration that the boundary conditions of the temperatures should identically be reproduced, the author concludes that a mechanical similarity can-not be accomplished together with a thermal similarity,

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except in case that both bearings are identical. Due to this fact, it is necessary to disregard an exact thermal similarity, and to achieve a quasi-similarity. The only practical solution is to achieve a corresponding average temperature:

$$t_m = \frac{1}{2}(t_1 + t_2), \tag{36}$$

by an adequately modifying the rate of flow of the lubricant. The author then establishes the similarity criteria, by considering two bearings of the same type, the one being the prototype and the other the model, for which the fundamental geometrical and functional measurements are changed in ratio with α_1. Based on his calculations, the author came to the result that experimentation with bearing models with variable loads and velocities is possible. Hence, it is necessary to identically reproduce the kinematics of the bearing's motion and to provide an installation which may simulate the variation of the load. In case of bearings operating in turbulent conditions the operational parameters depend on the

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Reynolds number of the motion in the lubricant layer. Thus, in addition to the above mentioned conditions, the Reynolds number should also be the same. In case of bearings lubrified with water or other liquids, the viscosity of which varies less with the temperature, a thermal similarity can be avoided by considering q = 0. In this case, it is theoretically possible to vary α_μ in such a way that α_ω should not considerably increase. The author then treats the case of gas lubrification, establishing the fact that the motion in the lubricant layer depends on the geometrical characteristics of the bearing, the nature of the gas, c_p/R, and the dimensionless parameters H(7) and G(16). The author repeats that all operational parameters depend on ε, λ, n, and H. Since the exponent n has a low influence, one may take n = 1. The author then establishes the similarity criteria by considering two bearings, a model and a prototype, being geometrically similar:

$$\left.\begin{array}{ll} \text{prototype:} & l;\ c;\ p_0;\ \rho_0;\ V;\ \mu, \\ \text{model} & : \alpha_c l;\ \alpha_l c;\ \alpha_p p_0;\ \alpha_\rho \rho_0;\ \alpha_v V;\ \alpha_\mu \mu. \end{array}\right\} \quad (72)$$

(72)

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The condition, H = constant, leads to the following conditions between the α_i coefficients:

$$\frac{\alpha_\mu \alpha_1 \alpha_v}{\alpha_p \alpha_c^2} = 1; \tag{73}$$

hence, only five out of the six conditions of (72) may be arbitrarily selected, the last resulting from (73). Then one may deduce for the prototype and model

$$\left.\begin{array}{l} \text{prototype:}\quad u;\quad w;\quad p;\quad \rho;\quad h_1 \\ \text{model:}\quad \alpha_v u; \alpha_v w; \alpha_p p; \alpha_\rho \rho; \alpha_l h_1 \end{array}\right\} \qquad (74) \tag{74}$$

and

$$\left.\begin{array}{l} \text{prototype:}\quad P;\quad F;\quad f;\quad M;\quad W;\quad \mathcal{M}_{e1} \\ \text{model:}\quad \alpha_p \alpha_l^2 P; \alpha_p \alpha_l \alpha_c F; \frac{\alpha_c}{\alpha_l} f; \alpha_p \alpha_l^2 \alpha_c M; \alpha_p \alpha_l \alpha_c \alpha_v^2 W; \alpha_p \alpha_l \alpha_v \alpha_c \mathcal{M}_{e1} \end{array}\right\} \qquad (75) \tag{75}$$

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Similarity criteria in the ...

A thermal similarity may only rarely be realized, and then by taking $\alpha_v = 1$, and $\alpha_c = \sqrt{\alpha_l}$. If for instance $\alpha_l = 1/2$, there results: $\alpha_\omega = 2$, $\alpha_T = 1$, $\alpha_\rho = 1$, $\alpha_p = 1$, and

$$\left.\begin{array}{l} \text{prototype: } P; \quad F; \quad f; \quad M; \quad W; \quad \mathcal{M}_{e}, \\ \text{model: } \alpha_l^0 P; \ \alpha_l^{\frac{3}{2}} F; \ \alpha_l^{-\frac{1}{2}} f; \ \alpha_l^{\frac{5}{2}} M; \ \alpha_l^{\frac{3}{2}} W; \ \alpha_l^{\frac{3}{2}} \mathcal{M}_{e} \end{array}\right\} \quad (81) \qquad (81)$$

In the case of gas lubricated bearings operating in turbulent conditions, in addition to the previous conditions, the Reynolds number should remain the same:

$$\frac{\alpha_\rho \, \alpha_v \, \alpha_c}{\alpha_\mu} = 1. \qquad (82)$$

The author finally notes that the relations (73) and (82) can be satisfied if it is possible to experimentally modify the lubricant's density in a certain ratio. There are 5 Soviet-bloc references.

SUBMITTED: October 6, 1960

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33740

R/008/61/000/006/002/005
D272/D304

26.2182

AUTHOR: Constantinescu, V.N.

TITLE: Determining the pressure distribution in hydrostatically lubricated bearings by using a hydrodynamic analogy

PERIODICAL: Studii şi cercetări de mecanică aplicată, no. 6, 1961, 1239 - 1256

TEXT: It has been shown that the usual methods for solving the lubrication problem can be applied only to certain cases of hydrostatically lubricated bearings, while it is impossible to do so in other cases where the calculations become laborious. If one starts in these cases from the observation that the pressure equation is homogeneous (Ref. 2: Comunicarile Acad. R.P.R., no. 2, 281-4, 1956) and that the thickness of the lubricant layer is constant, the pressure of a function of it is harmonic. If

$$\eta = p^{\frac{1}{\varkappa} + 1} \qquad (1)$$

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the differential equation of the pressure becomes

$$\frac{\partial}{\partial x}\left(h^3 \frac{\partial \eta}{\partial x}\right) + \frac{\partial}{\partial z}\left(h^3 \frac{\partial \eta}{\partial z}\right) = 0 \qquad (2)$$

and as the film thickness h is constant the result is

$$\Delta \eta = \frac{\partial^2 \eta}{\partial x^2} + \frac{\partial^2 \eta}{\partial z^2} = 0. \qquad (3)$$

X

In the conditions where (3) is valid it is possible to use the methods of hydrodynamics of potential plane movements and the problem becomes a variant of the Helle-Shaw problem. It is further demonstrated that by choice of suitable analogous equations, the resulting solutions represent movement with identical current lines, the equipotential lines being identical with the constant pressure lines. By applying these considerations it was possible to reinvestigate the cases studied by Ya.M. Kotlyar (Ref. 3: Izvestiya Akademii Nauk SSSR, Otdeleniye tekhnicheskikh nauk, no. 10, 12-18, 1957) and by S. Raynor as well as a series of other more complicated configu-

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rations: Circular surfaces with eccentric feeding of lubricant, circular surfaces with feeding from one or more rows of orifices, parallel strips fed by a row of orifices, circular corona fed by one row of orifices, surfaces of any form, rectangular surfaces, circular sector surfaces, surfaces fed by a slit, conical surfaces, and the case of variable lubricant film thickness (radial bearings). It is concluded that the method enables, at least theoretically, the solution of all problems connected with the flow of a gas fed under pressure to the space between two parallel surfaces, and can be extended to variable layer thickness. There are 13 figures and 7 references: 5 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: S. Raynor, A. Charnes, Flow Parameters in Hydrostatic Lubrication for Several Bearing Shapes, Transactions of the ASME, Series D, Journal of Basic Engineering, 82, 2, June 257-264, 1960; H.I. Helle Shaw, Investigation of the Nature of the Surface Resistance of Water and of Stream, Live Motion under Certain Experimental Conditions - Trans. of the Institution of Naval Architects, 40, 1898.

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CONSTANTINESCU, V. N.

Flow with friction of a gas between two parallel surfaces. Studii cerc mec apl 12 no.4:809-826 '61.

(Frictional resistance (Hydrodynamics))
(Gas flow)

CONSTANTINESCU, V. N.

On the pressure distribution in hydrostatic bearings. Studii cerc mec apl 12 no.5:1101-1116 '61.

30399

R/008/62/013/002/004/009
D272/D308

11.9800
24.4300

AUTHOR: Constantinescu, V.N.

TITLE: Flow of high velocity gases in thin layers

PERIODICAL: Studii și cercetări de mecanică applicată, no. 2, 1962, 383 - 400

TEXT: The author considers the flow of a viscous gas through a nozzle with reduced transversal dimensions so that the boundary layer developing close to the walls occupies the entire cross section. Assuming that the median surface y = 0 shifts with a tangential velocity V, the flow through the nozzle is equally due to a pressure gradient and friction drag. The effect of the tangential velocity V and the variation of the thickness h with longitudinal coordinate x are considered especially. The author derives the equations of the problem and emphasises some qualitative differences occurring when the velocities in the gas layer exceed a critical value (equal to the velocity of sound in a first approximation). Finally he derives a differential equation for pressure and calculates the pressure distribution for bearings consisting of plane sur-

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Flow of high velocity gases in ... R/008/62/013/002/004/009
D272/D308

faces and it is demonstrated that in bearings reaching speeds of rotation of the order of 100,000 rpm the effect of the inertial forces is negligible. Critical rotational speeds for a circular bearing with 2 cm diameter are of the order of 600,000 rpm in accordance with a critical velocity of V = 600 m/sec. There are 10 figures.

SUBMITTED: December 19, 1961

Card 2/2

DOMSA, A.; PALFALVI, A.; BOTHA, I.; NICOLAE, V.; COLAN, H.; SANDOR, L.; FILIPESCU, M.; PECULEA, M.; CONSTANTINESCU, V.

Studies on the antifriction materials Fe-graphite and Fe-Cu graphite. Stuiii cerc metalurgie 7 no.4:441-456 '62.

CONSTANTINESCU, V.N.

Computing hydrostatic gas bearings fed under pressure through a large number of holes, or porous surfaces. Studii cerc mec apl 13 no.1:175-191 '62.

CONSTANTINESCU, V. N.

"Theory of hydrodynamic lubrication" by O. Pinkus and B. Sternlicht. Reviewed by V. N. Constantinescu. Studii cerc mec apl 13 no.1: 259-260 '62.

CONSTANTINESCU, V.N.

Influence of the variation of the lubricating film thickness on the operational characteristics of gas-lubricated bearings. Studii cerc mec apl 13 no.3:761-771 '62.

44384
R/008/62/013/005/006/008
A065/A126

11.9900

AUTHOR: Constantinescu, V.N.

TITLE: On gas lubrication in turbulent operational conditions

PERIODICAL: Studii şi cercetari de mecanica aplicata, v. 13, no. 5, 1962, 1,157 - 1,175

TEXT: The paper presents a comprehensive image on the qualitative and quantitative influence of turbulence on the operational characteristics of gas-lubricated bearings. Examining the conditions of transition from laminary to turbulent flow, the author has found that the turbulence appeared in gas-lubricated bearings only at great thicknesses, or high revolution velocities. By using Prandtl's hypothesis on the mixing length and the formulas mentioned by the author in Refs. 1 and 4 (V.N. Constantinescu, Studii şi cercetări de mecanică aplicata, IX, 1, 139 - 162, 1958; Proceedings of the Institution of Mechanical Engineers, London, 173, 38, 881 - 900, 1959) for liquid-film bearings, he analyzes the pressure distribution in sleeve and in thrust bearings. The results can also be extended to non-stationary conditions or to bearings subjected to variable

Card 1/2

On gas lubrication in turbulent operational conditions R/008/62/013/005/006/008
A065/A126

forces and speeds. A final examination is devoted to pressure-fed bearings and the influence of the inertia forces. Conclusions: The turbulence appears in gas-lubricated bearings under hydrodynamic conditions at the upper speed limits of presently used bearings. The effect of turbulence on pressures is very low and even negligible if the H number has sufficiently high values. The friction considerably increases with the Reynolds number. However, the turbulence generally does not affect very much the operational characteristics of the bearings. In case of hydrostatic bearings, the load-carrying capacity increases due to a comparative reduction of the lubricant delivery. The influence of the inertia forces is the same as in the case of laminary flow, being negligible as long as the average velocity in the lubricant layer is below a certain critical value. There are 10 figures.

SUBMITTED: March 26, 1962

Card 2/2

CONSTANTINESCU, V.N.

Some approximate methods for computing the gas-lubricated journal bearings. Studii cerc mec apl 13 no.4:935-955 '62.

CONSTANTINESCU, V.N.

Gas lubrication in turbulent flow. Studii cerc mec apl 13 no.5:1157-1175 '62.

CONSTANTINESCU, V.N.

"Some problems of nonstationary flow of viscous fluids" by D.Ye. Dolidze. Reviewed by V.N.Constantinescu. Studii cerc mec apl 13 no.5:1333-1334 '62.

CONSTANTINESCU, V.N.

"Friction and wear and tear" by [prof.] I.V.Kragel'skiy. Reviewed by V.N. Constantinescu. Studii cerc mec apl 13 no.6:1623-1625 '62.

CONSTANTINESCU, V.N.

Determininination of pressures in gas lubricated bearings consisting of rectangular plane surfaces. Studii cerc mec apl 14 no.2:289-299 '63.

CONSTANTINESCU, V. N.

Approximate determination of pressure distribution in turbulent gas lubricated bearings. Studii cerc mec apl 14, no. 6: 1415-1429 '63.

CONSTANTINESCU, V.N.

Determination of pressures in gas lubricated bearings consisting of rectangular plane surfaces. Rev mec appl 9 no. 1:145-155 '64.

CONSTANTINESCU, V.N.

Gas lubricated bearings under variable forces and velocities.
Rev mec appl 9 no. 2:263-284 '64.

CONSTANTINESCU, V.N.

Approximate determination of the pressure distribution in gas lubricate bearings in turbulent regime. Rev mec appl 9 no.4: 77_-784 '64.

CONSTANTINESCU, V.N.

Influence of the molecular character of motion on the hydrodynamic lubrication with gases. Studii cerc mec apl 15 no.1:17-33 '64.

CONSTANTINESCU, V.N.

On the hydrodynamic instability of circular bear'ngs lubricated with gases. Studii cerc mec apl 16 [i.e. 15] no.3:635-655 '64.

1. Submitted February 22, 1964.

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00030932(

L 24143-66 T DJ

ACC NR: AP5014662 SOURCE CODE: RU/0019/65/010/002/0421/0437

AUTHOR: Constantinescu, V. N.

ORG: Institute of Applied Mechanics, Academy of the R. P. R.

TITLE: Improvement of the turbulent lubrication theory, using the mixing-length hypothesis

SOURCE: Revue Roumaine des sciences techniques. Serie de mecanique appliquee, v. 10, no. 2, 1965, 421-437

TOPIC TAGS: lubrication theory, turbulent lubrication, turbulent mixing, parameter, nonplanar flow, mixing length hypothesis

ABSTRACT: The paper contains a critical examination of the turbulent lubrication theory pointing out that the mixing-length hypothesis may be considered as a useful method in developing a coherent theory of turbulent lubrication. At the same time some improved relations for the calculation of the parameters k_x and k_z are given, as well as some considerations of the determination of the constant which determines the mixing-length variation and of the use of the mixing-length hypothesis for nonplanar flows. Orig. art. has: 7 figures, 1 table and 32 formulas. [Based on author's abstract] [XS]

SUB CODE: 11, 20/ SUBM DATE: 08Dec65/ ORIG REF: 005/

Card 1/1 UDC: 621.89 SOV REF: 001/ OTH REF: 012/

ACC NR: AP6029841 SOURCE CODE: RU/0019/66/011/004/0925/0951

AUTHOR: Constantinescu, V. N.

ORG: Institute of Fluid Mechanics, Academy of the Socialist Republic of Rumania

TITLE: Magnetogasdynamic lubrication

SOURCE: Revue Romaine des sciences techniques. Serie de mecanique appliquee, v. 11, no. 4, 1966, 925-951

TOPIC TAGS: gas lubrication, magnetogasdynamics, film lubrication, pressure lubrication, gas flow, electromagnetic field

ABSTRACT: The motion of gas in thin layers is studied theoretically by assuming the existence of electrical conductivity for the gas and considering that the motion is influenced by external electromagnetic fields. The correct consideration of the problem requires a microscopic study, similar to the molecular character of the flow. However, for this study the gas is assumed to be a continuous medium. The motion equations in the lubricating film are deduced for the conditions of existence of any one magnetic and electric field by starting from the general equations of magneto-hydrodynamics and by using the simplification and approximations commonly accepted for the lubrication problem (based on the small thickness of the film). By assuming the lubrication velocity to be much smaller than that of light, and the energy in the electric field to be equal or smaller than the energy in the magnetic field,

ACC NR: AP6029841

the expression for the force and the Maxwell equations as well as the equations derived from them may be written exactly as for the magnetohydrodynamic lubrication with electrically conducting liquids. They also have the same form as the equations for incompressible lubricants. The above equations are used in considering a series of electromagnetic fields for various possibilities of practical construction. Two interesting cases result: a magnetic field transverse to the lubricated, insulated surfaces and a magnetic field tangential to the lubricated surfaces (the electrical current is normal to the surfaces of electrodes). For these two cases the velocity distributions are obtained by integrating the velocity equations and, by means of the continuity equation, the pressure differential equations are found. A qualitative study of the pressure equation shows an increase in pressure in the lubricating film and consequently in the load-carrying capacity for low flow velocities and in the presence of a transverse magnetic field. Orig. art. has: 3 figures and 78 formulas.

SUB CODE: 11,20/ SUBM DATE: 05Dec65/ ORIG REF: 001/ OTH REF: 015

Card 2/2

CONSTANTINIDE, A.; DRAGNEA, F.

Preparation of cysteamine hydrochloride and cystamine dihydrochloride from 2-mercaptothiazoline. Rev. chimie Min. petr. 12 no.8:476-477 Ag'61.

RUMANIA

CADARIU, Gh., Professor; G...INA, C., MD; CONSTANTINIDIS, A., MD; DECULE...U, F., MD; DAVIDE..., H., MD; RADU, I., Technician.

Institute of Hygiene and Labor Protection of the Rumanian People's Republic in Bucharest (Institutul de igiena si protectia muncii al R.P.R. din Bucuresti) - (for all)

Bucharest, Igiena, No 4, Jul-Aug 63, pp 309-314

"Functional Changes in the Organism of Workmen due to Local Vibrations." (With reference to the problem of an early diagnosis of the same.)

CONSTANTINESCU-IALOMITA, Gh.

RUMANIA / General Problems of Pathology. Shock. U-4

Abs Jour : Ref Zhur - Biol., No. 10, 1958, No 46766

Author : Hortolomei, N.; Busu, I.; Constantinescu-Ialomita, Gh.; Enescu, N. I.

Inst : The Medical Section of the Academy of Sciences People's Republic of Rumania.

Title : Heterotransfusion Shock. Experimental Studies.

Orig Pub : Bul. stiint, Acad. RPR. Sec. med., 1956, 8, No. 3, 763-774

Abstract : On the basis of tests on blood transfusions to dogs (in some cases after removal of the cerebral cortex, or after decerebration) of human blood of various types, or on perfusing isolated lower extremities (through the femoral artery and vein), etc., the authors assume that antigen

RUMANIA / General Problems of Pathology. Shock. U-4

Abs Jour : Ref Zhur - Biol., No. 10, 1958, No 46766

Abstract : decisive role in the appearance of heterotransfusion shock. Antigen causes the appearance of biological products which, in turn, cause an impairment of the inner structure of the organism and an irritation of nerve terminals of tissue and nerve centers. This phenomenon produces a disturbance in the regulatory activity of the central nervous system (CNS) which is effected by various defense mechanisms. Thus, the development of a severe shock syndrome becomes initiated.

Card 2/2

CONSTANTINESCU-MOCIUTCHI, L.; IONESCU, E.

On the electric conductibility of thin lead films deposited at low temperatures. Studii cerc fiz 11 no.3:541-555 '60. (EEAI 10:2)
(Lead) (Metallic films) (Electric conductivity)

CONSTANTINESCU-WAPPLER, C

RUMANIA / Pharmacology. Toxicology. Various Preparations. V

Abs Jour : Ref. Zhur - Biologiya, No. 3, 1959, 13987

Author : Mihai, C.; Constantinescu-Wappler, C.

Inst : -

Title : In Connection With the Lipotrophic Effect of Some Compounds of the Tricarboxylic Cycle.

Orig Pub : Med. interna, 1956, B8, No. 2, (6), 808-826

Abstract : The connection of chronic hepatitis with a disorder of metabolism was established. Clinical observations and laboratory analyses demonstrated the presence of an excess of pyroracemic acid in patients with hepatitis. This excess may be eliminated either by means of enzyme A or acetylcoenzyme utilization or by means of utilizing succinic, malic or fumaric acids. 35 mice

Card 1/3

RUMANIA / Pharmacology. Toxicology. Various Preparations. V

Abs Jour : Ref. Zhur - Biologiya, No. 3, 1959, 13987

were chronically poisoned with carbon tetrachloride (I), which induced steatosis and cirrhosis of the liver. 0.05-0.1 ml of I was introduced subcutaneously. The animals perished in the course of 2-10 days, with the presence of steatosis and necrosis. With simultaneous introduction of methylene blue, the mice perished only on the 17-40th day. The animals which were given dicarbosylic acids lived for a duration of 2 months. In mice to which succinic acid was introduced, no appearance of steatosis or necrosis was noted; the histological picture of the liver was normal. The effect of malic and fumaric acids was expressed to a lesser degree. It is assumed that the above-named acids defend

Card 2/3

RUMANIA / Pharmacology. Toxicology. Various Preparations.

V

Abs Jour : Ref. Zhur - Biologiya, No. 3, 1959, 13987

the liver parenchyma, suppressing steatosis, and increase the glycogenic and aminoacid load of liver cells. It is conceivable that by means of stimulation of the aerobic carbon metabolism and cell respiration, they also produce a general defensive effect against I. -- E. M. Shaynbaum

Card 3/3

KONSTANTINESCU-YASH', P.

AUTHOR: Konstantinesku-Yash', P., Academician, Director of the Rumanian-Soviet Scientific Institute. 30-10-22/26

TITLE: Close Ties (Krepnushchiye svyazi).

PERIODICAL: Vestnik AN SSSR, 1957, Nr 10, pp. 132 - 137 (USSR)

ABSTRACT: The Rumanian-Soviet/Scientific Institute was taken over into the community of the Rumanian AS. The institute achieved a great task, especially by making **the Rumanian intellectuals familiar** with the successes of Soviet sciences and civilization. Moreover, the institute undertook to make the abundant Soviet documentation available to all universities, scientific institutes and public bodies. The activity of the institute is organizationally performed by the following divisions: Technical sciences, natural sciences, sciences of arts, and medicine.
The various divisions are in close contact with the respective corresponding Soviet institutions.
The institute has branches at 4 places in Rumania which have all translations from Russian literature available.
A close contact exists between the institute and the Rumanian-Russian museum which shows the Russo-Rumanian relations in a permanent exhibition, but which also points out the events taken place in the movements of revolution of the 19th and 20th century.

Card 1/2

30-10-22/26

Close Ties.

In the publishing enterprise attached to the institute, are published the following publications: "The Rumanian-Soviet-notes", with an index-volume arranged according to the contents and authors, periodicals containing abstracts, the weekly published bulletin of scientific information. Moreover, the following Russian periodicals are translated into Rumanian: "The Communist", "Soviet State and Right","Economical and Philosophical Problems".
Besides, the publishers have undertaken to publish integrally the complete editions of the greatest Russian scientists, as Lomonosov, Mendeleyev, Pavlov, etc.

ASSOCIATION: Rumanian-Soviet Scientific Institute

AVAILABLE: Library of Congress

Card 2/2

17(12), 5(1), 15(0) RUM/3-59-9-5/67

AUTHOR: Ioanid, G. Doctor, Constantinide, A. & Dragnea, F.

TITLE: The Preparation of Mercaptothiazolin Through the Action of Carbon Disulfide on Monoethanolamine

PERIODICAL: Revista de chimie, 1959, Nr 9, pp 510-511 (Rumania)

RUM/3-59-9-5/67

The Preparation of Mercaptothiazolin Through the Action of Carbon Disulfide on Monoethanolamine

were used, and the potassium hydrate was replaced with sodium hydroxide. By the tests carried out, in which an efficiency of 84% of pure mercaptothiazolin was obtained, the reaction of Knorr (Ref 5) of recognition of monoethanolamine was transformed into a reaction of preparation of mercaptothiazolin. The authors give full details on their experimental preparation. There are 7 tables and 5 references, 3 of which are German, 1 American and 1 French.

Card 2/2

SURNAME, Given Names
CONSTANTINIDE, A.

Country: Rumania

Academic Degrees: [not given]

1

Affiliation: -not given-

Source: Bucharest, Revista de Chimie, Vol 12, No 8, Aug 1961, pp 476-477.

Data: "The Preparation of Cysteamine Chlorhydrate and Cysteamine Dichlorhydrate from 2-mercaptothiazoline."

Authors:

CONSTANTINIDE, A.
DRAGNEA, F.

GPO 981643

21.7200

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R/003/60/011/005/008/023
A125/A026

AUTHORS: Adrian, P., Engineer; Arizan, D., Pharmaceutist; Constantinide, Al., Engineer

TITLE: Synthesis of Medicines With Traced Atoms

PERIODICAL: Revista de Chimie, 1960, Vol. 11, No. 5, pp. 276 - 282

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TEXT: Subject article deals with medicines, which contain one or more traced elements in their molecules. The authors mention the tracing process and the isotopes generally used and describe several examples of traced medicine synthesis, such as: a) synthesis of the traced glutamic acid; b) synthesis of the traced D_3 vitamin; c) cholestenon 4-^{14}C-enol-acetate (VII); d) cholesterin 4-^{14}C (VIII-a); e) epicholesterin 4-^{14}C (IX-a); f) cholesteryl 4-^{14}C-benzoate (VIII-b); g) 7-dehydrocholesteryl-4-^{14}C-(3', 5'-dinitrobenzoate) (XII-c); h) vitamin D_3-4-^{14}C-(3', 5'-dinitrobenzoate) (XIII-c); and i) vitamin D_3-4-^{14}C-butyrate (XIII-d). With regard to the radioactive biosynthesis, M.M. Leviton, V. A. Gotovtseva and others developed a medium of synthetic culture with a low content of sulfur in 1956. I.W. Halliday and H.R. Arnstein studied the biosynthesis capacity of the mycelium of "Penicillium chrysogenum" also in 1956. In the re-

X

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83519

Synthesis of Medicines With Traced Atoms R/003/60/011/005/008/023
A125/A026

search laboratory of the Fabrica de Antibiotice (Antibiotics Plant) in Iaşi, ^{35}S radioactive penicillin has been biosynthetized by the authors, together with the researchers of this Plant, i.e., chemist N. Ionescu, mycologist T. Gheorghiu and Doctor S. Niţescu. The authors then describe the equipment used, the biosynthesis process and the results of the experiments. From a total of 1,600 ml of mycelium, 803 mg of ^{35}S radioactive penicillin, potassium salt, white powder, i.e., 1,204,500 U.I. as biological activity, and a total of 115.3 μc of radioactivity have been obtained. Doctor Brînzei from the Spitalul de Boli Nervoase (Hospital of Nervous Diseases) in Socola recommended the study of the organotropism with different association forms of the radioactive penicillin. Together with pharmaceutist Dăneţ, the Pharmacodynamical Laboratory of the Vivarium Section of the Antibiotics Plant in Iaşi experimented with mice and guinea pigs. The authors synthetized the radioprotector isothiouranium of bromide-bromhydrate, traced with -^{35}S in the Radiomedicine Laboratory of the Secţia Radiochimie - ICECHIM (ICECHIM - Radiochemical Section), in order to check the distribution in the organism of rats irradiated with gamma rays and of non-irradiated rats. The distribution of isothiouranium of bromide-bromhydrate in the organism of irradiated and non-irradiated rats has been studied by lecturer Doctor O. Costăchel and biochemist N. Voiculeţ at the Laboratory of Radioisotopes of the Institutul On-

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Synthesis of Medicines With Traced Atoms

R/003/60/011/005/008/023
A125/A026

cologic (Oncological Institute). The organic synthesis is the safest method for a tracing by radioisotopes in the desired position. Other methods, i.e., biosynthesis, isotopic change, etc, can be used from case to case. There are 9 references: 5 Soviet, 2 English, 1 German and 1 unidentified.

X

Card 3/3

CONSTANTINIDE, A.; ARIZAN, D.; ADRIAN, P.

Use of radioisotopes in the pharmaceutical industry to obtain glutamic acid from casein. Rev chimie Min petr 14 no.1:23-27 Ja '63.

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00030932(

CONSTANTINIDI, MIHAELA

RUMANIA

NANOLESCU, E., MD; CONSTANTIDI, MIHAELA, MD.

Bucharest, Viata Medicala, No 2, 15 Jan. 63. pp 109-114.

"Up-to-date coronary-dilating medication."

POPESCU, M.P.; GRADINA, C.; CHIHAIA, Victoria; CINCA, N.; KRAUS, Floreta; CONSTANTINIDIS, Angela; PASCU, V.; ANITESCU, Constanta; CAZACEANU, Ecaterina

Ophthalmic angiodynamics in conditions of fluorescent illumination. Stud. cercet. fiziol. 10 no.3:273-280 '65.

14(10) SOV/99-59-6-8/13

AUTHOR: Konstantinidis, P.K., Engineer (Chimkent)

TITLE: Selecting the Right Type of a Water Intake Structure

PERIODICAL: Gidrotekhnika i melioratsiya, 1959, Nr 6, pp 39-40, (USSR)

ABSTRACT: The article discusses water intakes for rivers of the Fergana-type and stresses the importance of keeping the canal bottoms free of deposits. It then examines a water intake plan worked out by the Institut "Sredazgiprovodkhlopok" ("Sredazgiprovodkhlopok" Institute) during the period 1948-49 as a variant for an Araks river dam project. The plan's chief characteristic is its curved river bed which works like a curved gravel-absorbing installation. The plan was tested by I.K.Nikitin at the Gidrotekhnicheskaya laboratoriya Sredneaziatskogo nauchno-issledovatel'skogo instituta irrigatsii, or the

Card 1/2

SOV/99-59-6-8/13

Selecting the Right Type of a Water Intake Structure

SANIIRI, (Hydrotechnical Laboratory of the Central Asian Research Institute of Irrigation) in 1950. In conclusion, an improved version of the plan is presented, with a more advanced design to eliminate the deposits. There is 1 set of diagrams and 1 Soviet reference.

Card 2/2

Country : RUMANIA T
Category : Human and Animal Physiology.
Nerve and Muscle Physiology.
Abs. Jour. : Ref Zhur-Biol., No 23, 1956, 106747

Author : Arsenescu, Gh.; Teodorini, S.; Constantiniu, I.;*
Institut. : AS Rumania.
Title : Study Changes in Normal Electrograms of the Peripheral Nerve and Striated Muscles as Acetylcholine and Adrenalin are Applied to the Distal**
Orig. Pub. : Studii si cercetari fiziol. Acad. RPR, 1956, I, No 3-4, 315-331

Abstract : In experiments on a frog's in situ sciatic nerve and gastrocnemius muscle specimen , acetylcholine and adrenalin were correspondingly used in various concentrations as cathode and anode electrotonic substances (CTS and ATS). As acetylcholine and adrenalin were applied in divided doses,

Card: 1/3

*Mustata, N.
**End of Corresponding Tissue.

Country : RUMANIA
Category : Human and Animal Physiology. T
Nerve and Muscle Physiology.
Abs. Jour. : Ref Zhur-Biol., No 23, 1958, 106747

Author :
Institut. :
Title :

Orig Pub. :

Abstract (cont) : beginning with very small ones and increasing them until a monophase of activated current was reached, changes were observed. The increasing amplitude phase is specific for CTS and the same applies to a lesser extent to the phase of negative neuro- --------myogram terminal wave durations. The assumption is made that CTS and ATS are not polar by nature, i. e., that they possess dual characteristics of stimulative

Country : RUMANIA
Category= : Human and Animal Physiology. T
Nerve and Muscle Physiology.
Abs. Jour. : Ref Zhur-Biol., No 23, 1958, 106747

Author :
Institut. :
Title :

Orig. Pub. :

Abstract (cont) : phenonomena
type / which, like inhibitions, are not conditioned by their significance (as CTS and ATS), but by the degree of biochemical and electrical modifications.

Card: 3/3

T-5

RUMANIA/Human and Animal Physiology - Blood Circulation.

Abs Jour : Ref Zhur - Biol., No 7, 1958, 31681

Author : Arsenescu, Gh., Zamfirescu, N., Haulica, I., Constantinju, I., Teodorini Sanda

Inst : -

Title : Electrophysiological Investigations of the Phenomenon of Prohibitive Exhaustion of the Heart of a Frog by Means of Strophatine (Phenomenon Described by Daniyelopolu). Preliminary Report.

Orig Pub : Fiziol. norm. si patol., 1956, 3, No 2, 212-219.

Abstract : Daniyelopolu established that the isolated heart of a frog, stopped in a condition of contracture under the influence of massive doses of strophantine (I), can restore its performance in time under the action of massive doses of acetylcholine (II) or K. In the experiments of the authors, polarization by a direct-current cathode also caused restoration of the performance of the heart.

Card 1/2

CONSTANTINIU, I.

ARSENESCU, Gh.; CONSTANTINIU, I.; CORNEANU, M.; BITTMAN, E.; IONESCU, V.

Studies of the effect of atropine on the nervous system. I. Effect of atropine on the excitability of the higher nervous centers and on neuromuscular excitability in humans. Bul. stiint., sect. med. 8 no.4:919-936 Oct-Dec 56.

(ATROPINE, effects
on neuromusc. & higher nerv. center excitability, in humans)
(NERVE ENDINGS, eff. of drugs on
atropine, on neuromusc. excitability)
(CEREBRAL CORTEX, eff. of drugs on
atropine, on excitability of higher nerv. centers)